AEC-NASA TECH BRIEF

Solubility Data Are Compiled for Metals in Liquid Zinc

The problem:

To present existing data on the solubility of metals in liquid zinc in a more useful and convenient form. The solubility data for metals in such solvents as zinc are important for process development, corrosion studies, and theoretical studies of liquid-metal solutions.

The solution:

Available data on the solubilities of various metals in liquid zinc have been compiled into an up-to-date report. The temperature dependence of the solubility data is expressed using the empirical straight line relationship which exists between the logarithm of the solubility and the reciprocal of the absolute temperature.

How it's done:

The solubility of a metallic solute in liquid zinc, defined as the weight or atomic percent of the solute in the liquid zinc-rich phase in equilibrium with a solid phase, is presented in three forms:

1. Tabular form of both the original and smoothed data.
2. Graphs of original data, with a least-squares line drawn through the points.
3. Equations for the solubility as a function of temperature (based on least-squares line)

Solubility data and, when known, the composition of the equilibrium solid phase on the following zinc binary alloy systems are reported (alphabetical by chemical symbol):

silver–zinc
aluminum–zinc
barium–zinc
beryllium–zinc
arsenic–zinc
gold–zinc
cadmium–zinc
cerium–zinc
cobalt–zinc
chromium–zinc
copper–zinc
iron–zinc
gallium–zinc
germanium–zinc
indium–zinc
lanthanum–zinc
lithium–zinc
magnesium–zinc
magnanese–zinc
molybdenum–zinc
sodium–zinc
niobium–zinc
neodymium–zinc
nickel–zinc
bismuth–zinc
calcium–zinc
lead–zinc
palladium–zinc
praseodymium–zinc
platinum–zinc
plutonium–zinc
rhodium–zinc
ruthenium–zinc
antimony–zinc
silicon–zinc
tin–zinc
strontium–zinc
technetium–zinc
thorium–zinc
titanium–zinc
uranium–zinc
vanadium–zinc
yttrium–zinc
zirconium–zinc

Notes:

1. The information may be helpful in determining the feasibility of using liquid zinc as a solvent in a reactor fuel decontamination process.
2. It should be of interest to persons concerned with processes where liquid zinc is in contact with another metal, such as in soldering applications employing solders of a high zinc content.
3. Additional details are contained in *The Solubility of Metals in Liquid Zinc* by Irving Johnson and Ira G. Dillon, November 1965, ANL-7083 available from the Clearinghouse for Scientific and Technical Information, Springfield, Virginia 22151, price $3.00 each (microfiche copies $0.65 each).

(continued overleaf)

4. Inquiries concerning this innovation may be directed to:

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Reference: B67-10191

Source: I. Johnson and I. G. Dillon
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Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:

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